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THIRD NATIONAL COMMUNICATION ON CLIMATE CHANGE



DISASTER RISK REDUCTION AND CLIMATE CHANGE

VULNERABILITY ASSESSMENT AND ADAPTATION MEASURES



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SOCIO-ECONOMIC STATUS AND THE CHALLENGE OF DISASTER RISK AND CLIMATE CHANGE

This publication summarizes key findings from an assessment of the socio – economic vulnerability assessment of the population in the ten municipalities in the Southeastern Planning Region in relation with disaster risk and climate change.

This assessment was made as part of the Republic of Macedonia's Third National Communication on Climate Change to the United Nations Framework Convention on Climate Change by the Ministry of Environment and Physical Planning with support from the United Nations Development Programme (UNDP) and the Global Environment Facility (GEF).

The full report is available at:
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Socio-economic status is one of the key factors that determine how effectively a population can prepare for and cope with the impacts of climate change. For while the impacts of climate change will affect the entire world, the negative effects will be far worse in poorer countries and poorer communities. Thus social vulnerability helps to explain why some communities suffer to differing extents from the same hazards.

People living in poverty have less capacity and resources to prepare for, adapt to and recover from the negative effects of climate change, including increased temperatures, reduced access to water, extreme weather events such as floods and hailstorms and other natural disasters. Many poor people live in substandard housing without insurance and do not have the financial means to rebuild their lives in the event of natural disasters. Many poor people and poor countries depend heavily on natural resources, moreover, making them more vulnerable to reduced crop yields and food shortages, droughts and water shortages.

Without adequate planning for adaptation that takes into account the needs of the most socio-economically vulnerable people in the population, the effects of climate change will not only hit the poor hardest but also exacerbate existing hardships, threatening to hinder and even set back the progress being made to combat poverty, even forcing populations to migrate in the worst scenario.

To reduce the negative effects of climate change on the most vulnerable people in society, adaptation measures need to be integrated within planning and development strategies. A key aim of such strategies should thus be to increase the capacity of the population, and especially the poorer members of society, to adapt to climate change.

Given the extent to which poverty exacerbates people's vulnerability to climate change, strategies to reduce poverty will need to be strengthened. Progress in reducing poverty, meanwhile, will depend on continuing progress in good governance, effective institutional structures and sustainable management of natural resources.

The Ministry of Environment and Physical Planning has produced three National Communications to the UN Framework Convention on Climate Change (UNFCCC), with UNDP's support, including a special assessment of the impact of climate change on the most socio-economically vulnerable population in the South-East Planning Region. This assessment was presented in three documents within the Third National Communication:

- *Demographic and socio-economic conditions in the 10 municipalities of the South-East Planning Region*
- *Indicators and indexes for assessing the socio-economic vulnerability of the population in relation to disaster risk reduction and climate change*
- *Assessment of the socio-economic vulnerability of the population in the 10 municipalities of the South-East Planning Region*

DATA LIMITATIONS

The first step in the project of assessing the socio-economic vulnerability of the population to climate change was to gather all relevant data on the population of the region. Despite obtaining data from numerous sources, the study identified a lack of regional data about household incomes and expenditures. Nor is there sufficient data available about poverty and the most socio-economically vulnerable groups in the region. And the study was further constrained by insufficient data at municipal level about healthcare, social protection, and other key areas. Much of the information available is outdated, since the last approved national census held was in 2002.

A major impediment encountered by the study was the lack of up-to-date demographic data at the level of the smallest settlements. Such data is vital for the analysis required to assess the vulnerability to climate change of different socio-economic groups in the population of the South-East Planning Region. A new national census will need to be held before local-level data becomes available.



DEMOGRAPHIC & SOCIO-ECONOMIC CONDITIONS IN THE SOUTH-EAST PLANNING REGION

Vulnerability is highly dependent upon local conditions, and it is therefore crucial to have a detailed profile of the area to be assessed.

There are 188 settlements in the South-East Planning Region with a total population of some 171,416. The Region comprises ten municipalities: Bogdanci, Bosilovo, Valandovo, Vasilevo, Gevgelija, Dojran, Konce, Novo Selo, Radovis and Strumica.

The Region as a whole has experienced modest population growth of 0.22% in recent years, though the population in six of the ten municipalities has been declining slightly, mainly due to migration. The density of the population differs significantly throughout the Region, with the municipality of Strumica having the largest number of people per area.

There are five urban settlements in the Region—Bogdanci, Valandovo, Gevgelija, Radovis and Strumica—and 45% of the Region's total population live in these settlements. Of the Region's non-urban settlements, 90 have a population of between 101 and 1,000 inhabitants, while 29 have between 1,001 and 3,000 inhabitants. There are also 28 settlements with less than 70 inhabitants and, according to the 2002 census, there are some 36 completely uninhabited settlements.

Of the total population of the Region, just over half are male. Women have significantly higher life expectancy.



The proportion of people in the Region aged 65 or older is rising, growing from 8.3% in 1994 to 12.2% in 2011. In the same period, the share of the population aged from 0–14 fell from 24.3% to 16.7%. The average age of the population has risen from 32.9 in 1994 to 38 in 2011, in line with national population trends. In the Region as a whole, the number of people capable of work is slightly greater than the number of people of dependent age.

The birth rate in the Region was 10.4 in 2011. The total fertility rate—i.e. the number of live births per woman—was about 1.4 in the period 2005–2011. This low fertility rate is below the safety margin for ensuring natural reproduction of the population.

In terms of ethnicity, 91% of the population of the South-East Planning Region are Macedonians, 7% are Turks, 1% are Serbs and about 1% are of other ethnic background, including Roma, Albanians and Vlachs. The ethnic structure did not change significantly between the last two national censuses held in 1994 and 2002.

There are very few Roma inhabitants in the South-East Planning Region, with the largest proportion (1.7%) in the municipality of Dojran. Very few Roma live in Bogdanci, Vasilevo and Novo Selo, while there no Roma were recorded in the census in Konče.

Seventy per cent of the population were born in the Region. The majority of the remaining 30% of the population are migrants from other municipalities within the country, while a small number have migrated from other states.

The number of people emigrating from the Region—mostly to other regions in the country but also to find work abroad—significantly exceeds the number of people migrating into the Region. The majority of those migrating into the Region are women aged from 20–34, with marriage being the main reason for their moving home. From 2005–2011, some 6,068 people left the Region, of which 581 emigrated abroad.

The main causes of death in the region are circulatory diseases (63%), neoplasms (20%), followed by endocrine, nutritional and metabolic diseases (4%) and from diseases of the respiratory system (4%).

Some 33.9% of the Region's population aged 15 years and over have completed secondary education, while 30.8% have completed primary education and about 4.2% have higher education. About 4% of the population over the age of ten are illiterate.

According to the last national census from 2002, over nineteen per cent of the population over the age of 15 in the South-East Planning Region are unemployed. Over 56% of the Region's population over 15 years of age were economically active in 2002, and 37% were employed. Employment rates amongst men are much higher than amongst women in the Region, with about 46% of adult men in work compared to 27.9% of adult women.

In comparison to the other regions in the Republic of Macedonia, the South-East Region has the highest rate of activity and employment (70.7 and 60.9 in 2012), and the lowest rate of unemployment of 13.8% (2012).

The average size of households in the Region is 3.4 persons. Some 88% of all households are single-family households. Eleven per cent are households with two or more families, while about 8.6% of households are single-person households.

Single mothers living with children make up 7.4% of single-family households.



DWELLING CONDITIONS

Of some 60,000 apartments in the Region, 36.5% were built before 1971 and 63.5% were built between 1971 and 2002. Some 7.8% of all apartments in the region are empty, with much higher numbers in Gevgelija and Dojran where many apartments are used as summer vacation residences.

In the period 2005–2012, some 2,717 new apartments were constructed in the Region. The average area of dwelling space per person in a household is 20.7 m², slightly above the national average of 19.7.

DRINKING WATER SUPPLY

According to the national census held in 2002, 84.5% of households in the South-East Region get their drinking water from the public water supply system. Some 8% obtain water from a connection to their own water-pump systems, 2.6% from springs, 4.8% from wells and 0.2 % directly from a river or a lake. (No more recent statistics about potable water supply are available.)

EDUCATION

At the beginning of the 2012/2013 academic year in the South-East Region There are currently 119 regular primary schools in the Region with 15,318 pupils. The number of pupils attending primary schools has dropped by 22% since 2000.

There are 8 regular secondary schools in the Region, with 6,613 students enrolled in 2012. The number of students in secondary education has fluctuated over recent years.

A total of 4,569 students born in the Region graduated from higher education between 2002 and 2011. Of these graduates, 2, 839 were female.

There are five state kindergartens in the Region, with a combined capacity for 2,340 children. (In 2012, 93% of this capacity was being used.)

Some 767 primary school pupils in the South-East Region were provided with free transportation to school.

SOCIAL PROTECTION

The period 2000–2011 saw a drastic decline in the number of households receiving social welfare throughout the country. In the South-East Region, the number dropped by as much as seventy per cent.

Some 1,702 households in the South-East Region in 2011 were receiving social welfare - a total of 5,938 household members, or 3.3% of all households in the Region. In 2002, this figure was 11.6% of households.

ECONOMIC PROFILE

The South-East Planning Region accounted for 9.7% of the country's Gross Domestic Product in 2011. (The capital city, Skopje, accounted for more than 42 per cent.) In terms of GDP per inhabitant, the figure for the South-East Region is higher than the national average, with an index of 115.6. (Skopje has an index of 144.)

Most of the Region's contribution to GDP is generated by agriculture, forestry and fishing. In 2011, these activities accounted for 33.2% of the gross-added value of the South-East Region. (In 2005, this figure was significantly higher, at 43.3% of the Region's gross added value.)

17.7% of gross added value was generated in the area of wholesale and retail; vehicle repair services; transportation and storage; accommodation and catering.

17.6% was generated in the area of mining and quarry; light manufacturing industry; electricity, gas, steam and air-conditioning supply; water supply; waste water disposal; waste management; environment rehabilitation.

9% was generated in the area of public administration and defence; mandatory social insurance; education; healthcare and social protection.

A total of 6,247 businesses were active in the Region in 2011, of which the majority (63%) were micro businesses.

Recent years have witnessed a dramatic increase in tourism in the South-East Region, mostly due to the revitalization of Lake Dojran as a tourist resort. The number of tourists in 2011, for example, was 83% higher than the number in 2006, accompanied with a 40% increase in the number of overnight stays.





AGRICULTURE

The South-East Region is predominantly agricultural and accounts for most of the country's production of onions, tomatoes, peppers and cucumbers. The region is also the country's second biggest producer of tobacco, corn and potatoes, and the third biggest producer of wheat.

The period 2005–2012 saw constant growth in the production of potatoes, onions, tomatoes, peppers and cucumbers: the figures for tomato production in 2012 were 92% higher than in 2006, while onion production grew by 35 per cent. The same period witnessed a 29 per cent decline in the production of wheat and an 18% decline in the production of corn.

According to the 2007 Agricultural Census, there are 25,978 individual farms in the Region, as well as 61 businesses working with agricultural products. Some 67,000 members of households work on individual farms and 1,232 work in agricultural businesses. Another 22,275 seasonal workers are hired on farms in this region, of whom 30% are women.

The South-East Region is a major producer of fruits, with a 22% share of the country's total production of grapes and a 6% share in the total production of fruits. There has been an almost constant trend of increasing fruit production over recent years, with some crops more than doubling in output.

Twenty-five per cent of the country's cattle and 16% of goats are reared in the South-East Region. The total number of cattle, poultry and beehives in the region has been declining in the past decade.

The total forested area of the South-East Region accounts for 15% of the total area of forest in the country.



LABOUR MARKET & SALARIES

The South-East Region had the highest rate of economic activity (70.7%) and employment (60.9) of any other region in the country in 2012, with the lowest rate of unemployment, at 13.8%. (The official national rate of unemployment stands at around 31%.)

Unemployment is higher in urban settlements than in rural areas, due in part to the availability of work in agriculture.

The average paid net salary per employee in the South-East Region in 2011 is 16,169 MKD. (This is about 22.4% lower than the average at state level.) Thus while the South-East Region has a lower rate of unemployment than any other region, at the same time it also has almost the lowest average salary in the country.

Overall, most of the demographic indicators for the South-East Region have favourable values compared to the same indicators for the regions of Pelagonija and Vardar and the East and South-West regions, though less favourable than the indicators for the North-East, Polog and Skopje regions.

INDICATORS & INDEXES OF SOCIO-ECONOMIC VULNERABILITY TO CLIMATE CHANGE IN THE SOUTH-EAST PLANNING REGION.

After gathering all relevant data on the South-East Region, the next step in the project was to develop a set of indicators and indexes of socio-economic vulnerability in relation to climate change and disaster risks. This involved a review of the country's relevant legislation, policies and strategies, as well as a review of existing academic literature in order to identify the most appropriate definitions and conceptual framework for the vulnerability assessment.

The project next compiled a list of possible indicators based on theoretical models already applied in social vulnerability assessments related to natural hazards and climate changes in different countries. These indicators were then processed to construct an index of vulnerability.

It is vital to develop systems of indicators in order to assess the impact of disaster on social, economic and environmental conditions and to disseminate the results to decision-makers, the public and population at risk.

The research was hampered by the lack of up-to-date and accurate data. Above all, the assessment was limited by the fact that the last national census was held in 2002. The study therefore developed the index of socio-economic vulnerability by working on the assumption that no major changes have occurred in the population structure since 2002, while at the same time making use of data from surveys conducted in more recent years.

THE CONCEPT OF SOCIO-ECONOMIC VULNERABILITY IN RELATION TO CLIMATE CHANGE AND DISASTER RISKS

Defining social vulnerability and hazard risk

Vulnerability is divided into biophysical (or natural) vulnerability and socio-economic vulnerability). While biophysical vulnerability is dependent upon the characteristics of the natural environment itself, the socio-economic vulnerability of a population is determined by such factors as economic resources and living conditions, institutional structures, power relationships, institutions and cultural aspects.

Vulnerability to natural hazards refers to those characteristics of an element exposed to a natural hazard—whether that element is a certain group in the population or a whole society, a settlement or group of buildings, etc.—that contribute to or reduce the capacity of that element to resist, cope with and recover from the impact.

The Third National Communication project made use of the concept of vulnerability elaborated by the United Nations in 2004, which defines vulnerability as: ‘the conditions determined by physical, social, economic and environmental factors or processes which increase the susceptibility of a community to the impact of hazards.’ The UN definition further distinguishes four groups of vulnerability factors relevant to disaster reduction:

- **physical factors**, which describe the exposure of vulnerable elements within a region;
- **economic factors**, which describe the economic resources of individuals, groups and communities;
- **social factors**, which describe non-economic factors that determine people’s wellbeing, such as education, security, access to basic human rights, and good governance;
- **environmental factors**.







In terms of vulnerability to climate change, the project used the definition of the International Panel on Climate Change: 'Vulnerability is a function of the character, magnitude, and rate of climate change and variation to which a system is exposed, its sensitivity, and its adaptive capacity.'

Hazard is defined as 'a potentially damaging physical event, phenomenon or human activity characterized by its location, intensity, frequency and probability'.

In order to formulate a comprehensive and effective plan to mitigate the impact of hazards, it is crucial to understand that the impact of such hazards is determined by social vulnerability rather than solely exposure.

In the Republic of Macedonia, the main natural hazards are as follows:

- Extreme climate conditions in summer: high temperatures, drought and reduced water availability;
- Extreme climate conditions in winter: low temperatures, ice, snow, etc.;
- Outdoor fires and forest fires of high intensity;
- Heavy rainfalls and hail, causing floods, landslides and damage to infrastructure and agriculture;
- Earthquakes with disastrous consequences (e.g. in Valandovo and Gevgelija);
- Landslides, erosion and other tectonic disturbances.

The effects of such hazards include risks of injury and death, damage to health, including the outbreak of diseases, psychological trauma, economic losses, forced evacuation and property loss.

A vulnerability indicator for hazards of natural origin is a variable representing a characteristic or quality of a system that provides information about the susceptibility, coping capacity and resilience of a system to the impact of a natural hazard.

Commonly applied indicators of vulnerability include socioeconomic status, age special needs populations, gender and ethnicity. Ethnicity is relevant because ethnic minorities are typically more vulnerable to hazards for reasons including lower standards of living and housing, residence in more-hazard-prone areas, and discrimination and language barriers leading to reduced access to services. Gender is relevant because women often suffer disproportionately from the disasters for reasons including their traditional responsibilities as caregivers for the young and elderly, their greater vulnerability to the economic consequences of disasters such as unemployment arising from the closure of service industries in which women outnumber men as employees. The elderly and very young also suffer more negative consequences from hazards, often lacking the capacity to prepare or recover from such events. People living with disabilities are at higher risk - especially in emergency situations - for many reasons including reduced mobility, and emergency managers need to target areas with high concentrations of disabled people, particularly in group-living quarters, for early evacuation and other preparatory measures.



VULNERABILITY INDICATORS FOR THE SOUTH-EAST REGION

For the purposes of assessing the vulnerability of the South-East Region to climate change and hazards, a social vulnerability index was developed that takes into account the following 14 factors:

Socio-economic status: per capita income & average wage

Gender: percentage of households headed by females

Ethnicity: proportion of Roma in the population

Age: proportion below 6 years of age, proportion aged under 18, and the elderly

Housing: percentage of property-owners, percentage of those renting property

Employment: proportion of unemployed.

Occupation: percentage of agricultural, construction & low-skilled jobs

Family structure: percentage of single parents, female single parents & large families

Education: percentage who have not completed secondary school

Population growth: rate of growth

Access to medical services: density of medical establishments & services

Population with special needs: percentage of people with disabilities; number of people with disabilities in institutions

Population needing special treatment in disasters: tourists

Social dependence: percentage of people receiving social welfare

Since this is the first attempt undertaken in this country to assess vulnerability in relation to climate change, the selected set of indicators will need to be tested in practice and refined in future assessments.

VULNERABILITY INDEX OF THE POPULATION IN THE SOUTH-EAST REGION IN RELATION TO CLIMATE CHANGE AND DISASTER RISKS

Table: Social Vulnerability Index

Municipality	Bogdanci	Bosilovo	Valandovo	Vasilevo	Gevgelija	Dojran	Konče	Novo Selo	Radoviš	Strumica
Social vulnerability index (SoVI)	-3.84	-3.52	-0.44	1.76	-1.11	9.50	-0.004	-0.04	0.97	-3.28
% Roma	-0.64	-0.35	-0.16	-0.59	-0.56	2.58	-0.66	-0.61	1.14	-0.16
% young on age under 6	-1.37	-0.10	-0.24	1.78	-0.64	-0.43	0.90	-1.49	0.71	0.87
% elderly on age 65+	0.91	0.00	0.21	-1.91	0.72	0.58	0.01	1.56	-1.20	-0.89
agricultural workers per 1000 population	-0.56	1.45	0.01	1.78	-1.06	-0.73	0.75	0.37	-0.85	-1.16
% of owner occupied dwellings	-1.16	1.26	1.01	1.62	-0.67	-1.45	-0.29	0.51	-0.73	-0.08
% One parent family (father)	0.35	-1.66	0.94	-0.05	-1.17	1.08	-0.20	1.72	-0.82	-0.19
% One parent family (mother)	0.55	-0.99	0.02	-0.96	1.41	1.50	-1.54	0.50	-0.88	0.39
% of population living in single households	0.27	-1.44	0.37	-1.58	1.47	1.66	-0.52	-0.16	-0.05	-0.03
% Households consist of two or more families	-0.31	2.06	-0.62	0.04	-0.88	-0.10	-0.99	1.71	-0.75	-0.16
% of illiterate out of total population on age 9+	-1.35	0.30	-0.77	1.71	-1.53	-0.65	1.00	0.24	0.86	0.18
% of population with less than high school out of total population aged 15+	-0.12	0.86	-0.15	1.19	-1.49	0.00	1.45	0.58	-0.68	-1.65
Average annual population growth rate	-1.31	-0.65	0.18	1.71	0.38	-0.11	-0.32	-1.71	0.73	1.09
Doctors per 1000 population	-0.07	-0.89	0.10	-0.91	2.04	-0.41	-0.93	-0.63	0.04	1.66
% population with disabilities	0.11	-1.15	1.24	-1.09	1.53	-0.84	0.68	-1.09	1.03	-0.42
% population with disabilities residing in institutions	-0.33	-0.33	-0.33	-0.33	3.00	-0.33	-0.33	-0.33	-0.33	-0.33
Tourists per 1000 population	-0.35	-0.35	-0.35	-0.35	-0.22	3.00	-0.35	-0.35	-0.35	-0.31
% social security recipients	-0.94	-0.80	0.31	1.11	-0.71	0.43	-1.10	-1.08	1.71	1.07

VULNERABILITY OF THE MUNICIPALITIES IN THE SOUTHEAST REGION ACCORDING TO THE SOCIAL VULNERABILITY OF THE POPULATION

Table: Ranking of the municipalities in the Southeast region according to the level of social vulnerability of the population

Municipality	SoVI	Level of Social vulnerability
Bogdanci	-3,840	Low
Bosilovo	-3,518	Low
Strumica	-3,276	Low
Gevgelija	-1,109	Medium
Valandovo	-0,438	Medium
Novo Selo	-0,040	Medium
Konče	-0,004	Medium
Radoviš	0,973	High
Vasilevo	1,756	High
Dojran	9,497	High



The three municipalities with the highest level of socio-economic vulnerability to climate change in the South-East Region are those of Dojran, Vasilevo and Radovish. For each municipality, the factors determining their higher vulnerability are as follows:

The Municipality of Dojran

- tourists per 1,000 of the population
- proportion of Roma in the total population,
- proportion of population living in single households
- proportion of single-mother families
- proportion of single-father households
- proportion of elderly population aged 65 and over
- proportion of the population receiving social security

The Municipality of Vasilevo

- proportion of children under the age of 6 in the total population
- number of agricultural workers per 1,000 of the population
- proportion of illiterate population aged 9 and over
- average annual growth rate of the population
- proportion of population aged 15 and over without secondary education
- proportion of social security recipients in the total population

The Municipality of Radovish

- proportion of social security recipients in the total population.
- proportion of Roma in the total population
- proportion of people with disabilities in the total population
- proportion of illiterate people aged 9 and over
- average annual growth rate of the population
- proportion of children aged under 6 in the total population

Due to various limitations, including the lack of available up-to-date data, the indices of socio-economic vulnerability developed for the Third National Communication should be considered as approximations. Further qualitative research by the competent authorities is needed to obtain more specific information.

These indexes, if supplemented with additional findings, can serve as a guide for the development of policies to reduce social vulnerability in the region. They can also serve as a tool to measure progress in reducing social vulnerability.

The use of indices can be expanded to national level if indexes are calculated for other municipalities according to the same conceptual framework and the same input indicators.